REMARKS/ARGUMENTS

Claims 1-2, 5-6, and 13-20 stand rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent Application Publication No. 2004/0008784 by Kikuchi, et al. ("Kikuchi"). In addition, Claims 3-4 and 7-12 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Kikuchi in view of U.S. Patent Application Publication No. 2005/0123282 by Novotny, et al. ("Novotny").

The Applicant notes that Kikuchi is a new reference not cited by the Examiner in the first Office Action of May 10, 2007.

The Applicant respectfully submits that previously presented Claim 1 is patentable over Kikuchi as this reference does not teach or suggest the subject matter of Claim 1. In addition, the Applicant submits that Claims 2-20, being dependent on Claim 1, and adding patentable features thereto, are also patentable over Kikuchi. Accordingly, the Examiner is respectfully requested to reconsider the previously presented claims in the above listing of claims in view of the following comments.

For reference, previously presented Claim 1 recites the following:

> 1. (Previously Presented) A method for predicting motion vectors associated with blocks of pixels of a picture to be included in a data stream for differential motion vector coding of a video signal, said method comprising the steps of:
>
> organising a set of reference pictures into a pair of lists and according to each reference picture within said lists at least one reference index;
>
> associating with selected ones of said blocks in said video signal at least one motion vector that references a respective one of said lists, each vector associated with a selected one of the blocks referencing a different list of said lists, each vector defining disposition of said selected one of the blocks relative to a reference picture in the respective one of said lists; and,
>
> computing a predicted value for a current vector of said vectors for a current block from vectors of adjacent blocks referencing a same list of reference pictures as the current vector, wherein prediction of a motion vector that selects a reference picture

using a first list of reference pictures is not dependent upon motion vectors whose reference pictures are selected using a second list of reference pictures.

On page 3 of the Office Action the Examiner cites Kikuchi against Claim 1 stating (underlining added by the Applicant):

> "Kikuchi discloses a method for predicting motion vectors associated with blocks of pixels of a picture to be included in a data stream for differential motion vector coding of a video signal (Kikuchi: paragraph [0010], lines 1-12), said method comprising the steps of: organizing a set of reference pictures into a pair of lists and according to each reference picture within said lists at least one reference index (Kikuchi: paragraph [0038], lines 1-6); associating with selected ones of said blocks in said video signal at least one motion vector that references a respective one of said lists (Kikuchi: paragraph [0058], lines 1-9), each vector associated with a selected one of the blocks referencing a different list of said lists, each vector defining disposition of which of said selected one of the blocks relative to a reference picture in the respective one of said lists; (Kikuchi: paragraph [0061], lines 1-9); and computing a predicted value for a current vector of said vectors for a current block from vectors of adjacent blocks referencing the same list of reference pictures as the current vector (Kikuchi: paragraph [0102], lines 1-5), wherein prediction of a motion vector that selects a reference picture using a first list of reference pictures is not dependent upon motion vectors whose reference pictures are selected using a second list of reference pictures (Kikuchi: paragraph [0077], lines 1-8), as in claim 1."

For reference, the selections from Kikuchi, cited by the Examiner above, recite the following:

> "**[0010]** According to an aspect of the present invention, there is provided a video encoding method comprising: storing a plurality of encoded frames of a video in a memory; generating a to-be-encoded frame which is divided in a plurality of regions including at least one encoded region and at least one to-be-encoded region; generating a predictive vector of the to-be-encoded region of the to-be-encoded frame using a plurality of motion vectors as a plurality of reference vectors, the motion vectors being

generated with respect to at least one reference frame selected from the encoded frames for a motion compensative prediction when encoding an original region of the encoded region around the to-be-encoded region of the to-be-encoded frame; and encoding the to-be-encoded frame to generate encoded video data."

"**[0038]** The side data of the output from the variable length decoder **214**, i.e., the side data **202** including a motion vector encoded every macroblock and an index specifying a reference frame used for the motion compensative prediction is input to the motion compensative prediction unit (MC) **211**. The motion compensative prediction unit **211** executes selection of the reference frame, generation of the predictive vector and the motion compensative prediction according to the side data **202** to generate a predictive picture signal **203**. This predictive picture signal **203** is added to the predictive error signal **204** output from the inverse discrete cosine transformer **216** to generate a decoded picture signal **205**."

"**[0058]** The table 1 shows different reference frames between two reference frame indexes ref_idx_f and ref_idx_b. However, the reference frame may identify between two reference frame indexes ref_idx_f and ref_idx_b as shown in table 2.

TABLE 2

Index	ref_idx_f	ref_idx_b
0	rf0	rf0
1	rf1	rf1
2	rf2	rf2
3	rb0	rb0"

"**[0061]** In FIG. 3, distances from the frame (current) to be encoded to the reference frames rf0 and rf2 represented by the reference frame indexes ref_idx_f and ref_idx_b are referred to as FD 1 and FD 2. The distances from the reference frame rb0 with the reference macroblock coMB to the reference frames rf1 and rf0 represented by the reference frame indexes ref_idx_f and ref_idx_b are referred as to RFD 1 and RFD 2. The time intervals

FD1, FD2, RFD1 and RFD2 described above are referred to as interframe distances, frame output order differences, or differences in picture output orders hereinafter."

"**[0077]** The reference vector of the reference frame whose encoding order is near to the to-be-encoded frame may be used for a prediction. Supposing that the encoding order of frames is rf2, rf1, rf0 , rb0 and current. In two reference frames rf0 and rf1 used for encoding of reference macroblock coMB, the frame rf0 is near to the reference frame rb0 with coMB, so that the reference vector RMV(ref_idx_b) corresponding to the reference frame rb0 is used for a prediction."

"**[0102]** The computed vector WSRMV may be used as the predictive vector."

Also, please consider paragraphs 0009, 0041-0043, and 0052 of Kikuchi which recite the following (underlining added by the Applicant):

"**[0009]** The object of the present invention is to provide a video encoding/decoding method that can reduce the number of encoded bits of motion vectors required for performing a motion compensative prediction from a plurality of reference frames and a video encoding/decoding apparatus therefor."

"**[0041]** There are two following types of motion vector prediction encoding methods:

"**[0042]** [I] A prediction coding method using a motion vector of an encoded frame as a reference vector."

"**[0043]** [II] A prediction coding method using as a reference vector a motion vector of an encoded macroblock around a to-be-encoded block in a frame to be encoded."

"**[0052]** curMB shows a macroblock to be encoded in the frame to be encoded. coMB indicates an encoded macroblock (a reference macroblock) which is at spatially the same position as that of the block curMB in the reference frame rb0."

First, the Applicant respectfully submits that the only thing that the Applicant's invention and Kikuchi have in common is that they both perform motion vector prediction from a plurality of reference pictures for motion vector coding within a motion-compensated prediction and residual coding framework (e.g., MPEG2, H.264).

In Kikuchi, the aim is to reduce the number of encoded bits of motion vectors (see paragraph 0009, lines 2-3 of Kikuchi) by generating a single predictive vector using a plurality of motion vectors as a plurality of reference vectors, the motion vectors being generated with respect to at least one reference frame selected from the encoded frames (see paragraph 0010, lines 6-11, of Kikuchi).

In contrast, according to the Applicant's invention as recited in Claim 1, the aim is to reduce complexity by "organising a set of reference pictures into a pair of lists and according to each reference picture within said lists at least one reference index; associating with selected ones of said blocks in said video signal at least one motion vector that references a respective one of said lists, each vector associated with a selected one of the blocks referencing a different list of said lists, each vector defining disposition of said selected one of the blocks relative to a reference picture in the respective one of said lists; and, computing a predicted value for a current vector of said vectors for a current block from vectors of adjacent blocks referencing a same list of reference pictures as the current vector, wherein prediction of a motion vector that selects a reference picture using a first list of reference pictures is not dependent upon motion vectors whose reference pictures are selected using a second list of reference pictures".

More specifically, Kikuchi does not teach or suggest "organising a set of reference pictures into a pair of lists and according to each reference picture within said lists at least one reference index" as recited in Claim 1. Rather, Kikuchi divides a to-be-encoded (current) frame into a plurality of regions including at least one encoded region and at least one to-be-encoded region and generates a predictive vector (see paragraph 0010, lines 4-6, of Kikuchi) and an index specifying a reference frame (see paragraph 0038, lines 3-4, of Kikuchi).

Second, paragraph 0058 of Kikuchi refers to Table 1 (i.e., in paragraph 0054) which shows different reference frames between two reference frame indexes with the same index value. However, a particular reference frame may be identified by the same value of the two reference frame indexes as shown in Table 2 (see paragraph 0058). On the other hand, the Applicant's invention provides, as recited in Claim 1, "associating with selected ones of said blocks in said video signal at least one motion vector that references a respective one of said lists, each vector associated with a selected one of the blocks referencing a different list of said lists, each vector defining disposition of said selected one of the blocks relative to a reference picture in the respective one of said lists".

Third, in paragraph 0061 of Kikuchi, at lines 1-9, there is reference to differences in picture output orders. This is contrary to that element of Claim 1 that recites: "each vector defining disposition of said selected one of the blocks relative to a reference picture in the respective one of said lists".

Fourth, in paragraph 0102 of Kikuchi, it is stated that the computed vector, WSRMV, which is a weighted addition reference vector, computed based on frame-to-frame temporal distances, may be used as the predictive vector. From FIG. 5 of Kikuchi, the reference vector RMV that is used to compute this predictive vector is from "coMB", which is spatially the same as the current macroblock, but from a different frame than the current one (see paragraph 0052, lines 2-5, of Kikuchi). In contrast, according to the Applicant's invention as recited in Claim 1, the predictive vector is computed from the vectors of adjacent blocks referencing the same list of reference pictures as the current vector.

Fifth, in paragraph 0077 of Kikuchi, at lines 1-3, it is stated that the reference vector used for prediction is from a previously encoded frame whose encoding order is near to the to-be-encoded (current) frame. In contrast, according to the Applicant's invention as recited in Claim 1, the reference vectors that are used for prediction are those that reference the same list as the vector being computed, and are from adjacent blocks within the to-be-encoded (current) frame.

Sixth, the Applicant respectfully submits that all Kikuchi teaches from paragraph 0044 thru to paragraph 0169 is a "prediction coding method using a motion vector in an encoded frame as a reference vector" (see paragraph 0042, lines 1-2, of Kikuchi). The predicted vector is derived from

motion vectors from a previously encoded frame, and not from motion vectors that are associated with the adjacent blocks of the current frame as is recited in the Applicant's Claim 1.

As such, the Applicant respectfully submits that Kikuchi does not teach or suggest those elements of Claim 1 that recite: "organising a set of reference pictures into a pair of lists and according to each reference picture within said lists at least one reference index"; "associating with selected ones of said blocks in said video signal at least one motion vector that references a respective one of said lists, each vector associated with a selected one of the blocks referencing a different list of said lists, each vector defining disposition of said selected one of the blocks relative to a reference picture in the respective one of said lists"; and, "computing a predicted value for a current vector of said vectors for a current block from vectors of adjacent blocks referencing a same list of reference pictures as the current vector, wherein prediction of a motion vector that selects a reference picture using a first list of reference pictures is not dependent upon motion vectors whose reference pictures are selected using a second list of reference pictures".

For the reasons given above, the Applicant respectfully submits that Claim 1 is patentable over Kikuchi as this reference does not teach or suggest the subject matter of this claim. In addition, the Applicant submits that amended Claims 2-20, being dependent on amended Claim 1, and adding patentable features thereto, are also patentable.

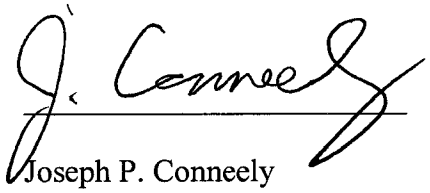
No new subject matter has been introduced by the above amendments (if any).

The Applicant respectfully requests that a timely Notice of Allowance be issued in this case.

Respectfully submitted,

McCarthy Tétrault LLP

Date: January 15, 2008

By 

Joseph P. Conneely
Registration No. 54,883
Telephone No. 416-601-8179
Fax No. 416-868-0673

McCarthy Tétrault LLP
Box 48, Suite 4700
66 Wellington Street West
Toronto Dominion Bank Tower
Toronto, Ontario, Canada
M5K 1E6